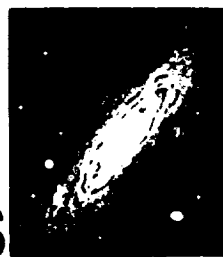




National Space Science Data Center/
World Data Center A For Rockets and Satellites

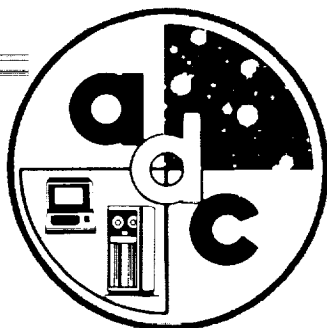


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***A CATALOG OF SELECTED COMPACT RADIO
SOURCES FOR THE CONSTRUCTION OF AN
EXTRAGALACTIC RADIO/OPTICAL
REFERENCE FRAME***

(Argue et al. 1984)

Documentation for the Machine-Readable Version



October 1990

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COMPACT RADIO SOURCES FOR THE CONSTRUCTION
OF AN EXTRAGALACTIC RADIO/OPTICAL REFERENCE
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National Space Science Data Center (NSSDC)/
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National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Abstract

The machine-readable version of the catalog, as it is currently being distributed from the Astronomical Data Center, is described. The catalog contains 233 strong, compact extragalactic radio sources having identified optical counterparts. The machine version contains the same data as the published catalog and includes source identifications, equatorial positions at J2000.0 and their mean errors, object classifications, visual magnitudes, redshifts, 5-GHz flux densities, and comments.

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1.0 Introduction

1.1 Description

This catalog was compiled to provide accurate positions for selected strong, compact extragalactic radio sources proposed for establishing an almost inertial reference frame against which the motions of Earth, galactic objects, and spacecraft may be measured. It is also intended to define sources for which precise optical positions should be determined in order to relate its established reference frame with the fundamental optical system of the FK5.

The candidate sources were selected from a number of astrometric and survey reference catalogs that are listed in Table 1 of the source reference. Six sources south of declination -45° were included from Jauncey *et al.* (1982). All selected sources display little or no spatial structure at the arcsecond level¹ and have flat or complex radio spectra. The accuracy of the radio positions of the catalog sources is $\leq 0''.1$, with the majority $\leq 0''.01$. Additional observations are expected to refine the positions to $\leq 0''.005$. It is expected that the machine-readable version of the catalog will be updated from time to time as improved positions become available.

This document describes the machine-readable version of the *Selected Compact Radio Source Catalog* as it is currently being distributed from the international network of astronomical data centers. It is intended to enable users to read and process the computerized catalog without problems and guesswork. For additional information concerning the reasons for the preparation of the catalog, the selection of candidate radio sources, and the distribution of sources over the sky, the source reference should be consulted. A copy of this document should be transmitted to any recipient of the machine-readable catalog.

1.2 Source Reference

Argue, A. N., de Vegt, C., Elsmore, B., Fanelow, J., Harrington, R., Hernenway, P., Johnston, K. J., Kühr, H., Kumkova, I., Niell, A. E., Walter, H., & Witzel, A. 1984, *A catalog of selected compact radio sources for the construction of an extragalactic radio/optical reference frame*, A&A, 130, 191.

¹ Four of the sources listed in the catalog have subsequently been dropped because they show unacceptable structure (Kumkova, I. I. 1990, private communication).

2.0 Structure

2.1 File Summary

The machine version of the *Selected Compact Radio Source Catalog* consists of a single file. Table 1 gives the machine-independent file attributes. All logical records are of fixed length, and, if the catalog is received on magnetic tape, it will contain blocks of fixed length (as noted below), except that the last block may be short.

<i>Selected Compact Radio Source Catalog</i> (Argue et al. 1984)				
File	Contents	Record Format	Logical Record Length	Total Number of Logical Records
1	Catalog	FB	90	233

Table 1. Summary Description of Catalog Files: FB = Fixed length blocks (last may be short)

The information contained in the above table is sufficient for a user to describe the indigenous characteristics of the machine-readable version of the *Selected Compact Radio Source Catalog* to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, density, number of tracks, and character coding (ASCII, EBCDIC) for tapes is not included, but should always accompany secondary copies if any are supplied to other users or installations.

2.2 Catalog (File 1 of 1)

Table 2 gives a byte-by-byte description of the contents of the data file. A suggested Fortran format specification for reading each data field is included and can be modified depending upon individual programming and processing requirements (Fortran 77 character string-type formats are used); however, caution is advised when substituting format specifications, since certain fields contain character data and others are blank when data are absent. Note that the number of observations, visual magnitude, redshift, and 5-GHz flux density fields are numerical, but are sometimes blank. This should not be confusing in the catalog because no valid zero values exist for these data. For such fields, primary numerical format specifications are given to indicate decimal point locations, while alternate A-type formats are specified in parentheses. Default (null) values are always blanks in data fields for which primary suggested formats are given as A. Where no default values are given for numerical fields, there are always valid data present.

Byte(s)	Units	Suggested Format	Default Value	Data
1-8	---	A8	---	Source designation
9	---	A1	---	Source code
10-20	---	A11	---	Other source name
21	---	1X	---	Blank
22-23	hours	I2	---	Right ascension, α
24	---	1X	---	Blank
25-26	min	I2	---	α
27	---	1X	---	Blank
28-34	sec	F7.4	---	α
35	---	1X	---	Blank
36-41	sec	F6.4	---	Error in α
42	---	1X	---	Blank
43	---	A1	---	Sign of declination zone
44-45	°	I2	---	Declination, δ
46	---	1X	---	Blank
47-48	'	I2	---	δ
49	---	1X	---	Blank
50-56	"	F7.4	---	δ
57	---	1X	---	Blank
58-62	"	F5.3	---	Error in δ
63	---	1X	---	Blank
64	---	I1 (A1)	blank	Number of catalogs
65	---	1X	---	Blank
66-67	---	A2	---	Optical identification code
68	---	1X	---	Blank
69-73	mag	F5.2 (A5)	blank	Visual magnitude
74	---	1X	---	Blank
75	---	A1	---	Left parenthesis
76-80	---	F5.3 (A5)	blank	Redshift
81	---	A1	---	Right parenthesis
82	---	1X	---	Blank
83-86	Jy	F4.1 (A4)	blank	5-GHz flux density
87	---	1X	---	Blank
88	---	A1	---	Observation code
89	---	1X	---	Blank
90	---	A1	---	Remark code

Table 2. Catalog Record Format

Source identification	Designation according to the IAU convention, which uses the B1950.0 coordinates of right ascension in hours and minutes followed by the sign and the declination truncated (not rounded) to a tenth of a degree.
Source code	An asterisk denotes a source south of declination -45° having a preliminary position from a joint CSIRO-JPL program (Jauncey <i>et al.</i> 1982).
Other source name	Names from other catalogs or lists by which a source is commonly known.
Equatorial coordinates	Weighted means of the right ascension and declination at equinox J2000.0. The weights assigned were inversely proportional to the squares of the quoted errors in position. Individual catalog positions that were presented at equinox B1950.0 were precessed to J2000.0 using the procedure described by Kaplan (1981). Epochs of observation used to precess the coordinates to J2000.0 were those given in the respective publications. The epochs, reference equinoxes, and adjustments made to the right ascension origins of individual catalogs are listed in Table 1 of the source reference.
Errors	Standard errors of the mean positions in right ascension and declination, taken as the greater of either the internal or external errors of the standard error of the mean. A right ascension error is not given for the source 3C 273 (1226+023) because the zero point in right ascension has been set to the position of 3C 273B reported by Hazard <i>et al.</i> (1971), which is defined here for J2000.0 as $12^{\text{h}} 29^{\text{m}} 06^{\text{s}}.6997$.
Number of catalogs	The number of different catalogs used to obtain the weighted mean.
Optical identification code	<p>A code letter to specify the optical identification of the object, as follows:</p> <p>G galaxy</p> <p>L BL Lacertae object</p> <p>Q quasar</p> <p>A question mark denotes uncertainty.</p>
Visual magnitude	The visual magnitude, as taken from any of a variety of sources.
Redshift	Sources are not given for redshift values. A value is surrounded by parentheses in bytes 75 and 81 if the z datum is uncertain.
5-GHz flux density	As measured with the VLA. It is the flux density of the entire source and the epoch of measurement is 1979.
Observation code	<p>The codes given in the source reference are as follows:</p> <p>A source observed by the VLA and JPL</p> <p>P primary VLA calibrator</p> <p>S secondary VLA calibrator</p> <p>However, only the "A" code is present in the published catalog.</p>

Remark code

A lower case letter for a remark listed following the published table:

- a** nebulous extension
- b** extended H Π
- c** optical double
- d** optical multiple
- e** optically diffuse
- f** nebulous (POSS E plate)
- g** diffuse (POSS O plate)

3.0 History

3.1 *Remarks*

The *Selected Compact Radio Source Catalog* was computerized at the Astronomical Data Center, NASA Goddard Space Flight Center, by keying the data directly into a disk file.

4.0 References

- Argue, A. N., de Vegt, C., Elsmore, B. Fanselow, J., Harrington, R., Hemenway, P., Johnston, K. J., Kühr, H., Kumkova, I., Niell, A. E., Walter, H., & Witzel, A. 1984, *A catalog of selected compact radio sources for the construction of an extragalactic radio/optical reference frame*, A&A, 130, 191
- Hazard, C., Sutton, J., Argue, A. N., Kenworthy, C. M., Morrison, L. V., & Murray, C. A. 1971, *Nature*, 233, 89
- Jauncey, D. L., Preston, R. A., Niell, A. E., Harvey, B., Meier, D. L., Moraboto, D. C., Slade, M. A., & Tzjournis, A. 1982, private communication cited in source reference
- Kaplan, G. H. 1981, United States Naval Obs. Circ. No. 163

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5.0 Sample Listing

The sample listing given on the following pages shows logical records exactly as they are recorded in the machine-readable version of the catalog. Groups of records from the beginning and end of the file are illustrated. The beginning of each record and the bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

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Data File Name: Selected Radio Sources

Records 1 to 20

Data File 2

Record Length 90 bytes

Input VOLSER YWK010

[illegible]

Record	1	0003-066	00 06	13.895	0.003	-06	23	35.34	0.04	3	G	19.7	1.5
Record	2	0008-264	00 11	01.2472	0.0004	-26	12	33.381	0.006	1	Q	19.0	
Record	3	0016+731	00 19	45.789	0.005	+73	27	30.07	0.04	2	Q	18.	1.7
Record	4	0019-000 4C+00.02	00 22	25.428	0.003	+00	14	56.14	0.04	2	G	21.1	1.1
Record	5	0022-423	00 24	42.993	0.003	-42	02	03.58	0.04	2	?	22.	1.5
Record	6	0026+346 0B 343	00 29	14.242	0.003	+34	56	32.22	0.04	2	G	20.2	1.2
Record	7	0056-001 4C-00.06	00 59	05.5139	0.0005	+00	06	51.66	0.03	3	Q	17.7	1.4
Record	8	0104-408	01 06	45.1079	0.0003	-40	34	19.956	0.03	2	Q	18.1	
Record	9	0106+013 4C 01.02	01 08	38.7711	0.0005	+01	35	00.319	0.005	2	Q	18.5	2.107
Record	10	0111+021	01 13	43.144	0.002	+02	22	17.30	0.03	2	G	16.3	0.047
Record	11	0112-017 UM 310	01 15	17.095	0.003	-01	27	04.59	0.04	2	Q	17.	1.365
Record	12	0113-118	01 16	12.5222	0.0005	-11	36	15.437	0.007	2	G	18.5	0.9
Record	13	0116+319 4C 31.04	01 19	34.998	0.003	+32	10	50.04	0.04	3	G	15.7	1.5
Record	14	0119+041 0C 033	01 21	56.860	0.007	+04	22	24.7	0.1	1	Q	19.5	1.1
Record	15	0133+476 0C 457	01 36	58.5950	0.0005	+47	51	29.104	0.002	3	L	18.	2.0
Record	16	0135-247 0C-259	01 37	38.346	0.003	-24	30	53.83	0.04	2	Q	16.9	0.7
Record	17	0138-097	01 41	25.832	0.003	-09	28	43.69	0.04	2	L	18.	1.2
Record	18	0146+056 0C 079	01 49	22.374	0.003	+05	55	53.55	0.04	2	Q?	20.	2.345
Record	19	0149+218	01 52	18.055	0.004	+22	07	07.69	0.08	2	Q	18.	1.4
Record	20	0153+744	01 57	34.976	0.003	+74	42	43.26	0.04	2	Q	16.	1.1

